Level | Pressure | Flow | Temperature | Liquid Analysis | Registration | Systems Components | Services | Solutions

Technical Information

RIA141

Digital field loop powered display unit with explosion proof enclosure

Application

- Oil & gas
- Petrochemical industry
- System and apparatus engineering
- Outdoor applications
- Laboratory facilities
- Process data acquisition and monitoring
- Optional: stainless steel housing for EEx d application

Your benefits

- Loop-powered display unit in single compartment housing
- 5-digit LC display, character height 20.5 mm (0.8")
- Illuminated display, rotatable
- Trend bargraph in increments of 10%
- Background illumination without additional power supply
- Measuring range display from -19999 to 99999
- Digital limit switch
- Freely programmable units
- 3-key operation
- Approvals: ATEX, FM, CSA and NEPSI
- 3 cable entries
- Configuration with ReadWin® 2000 PC software
- Configuration without power supply using setup box

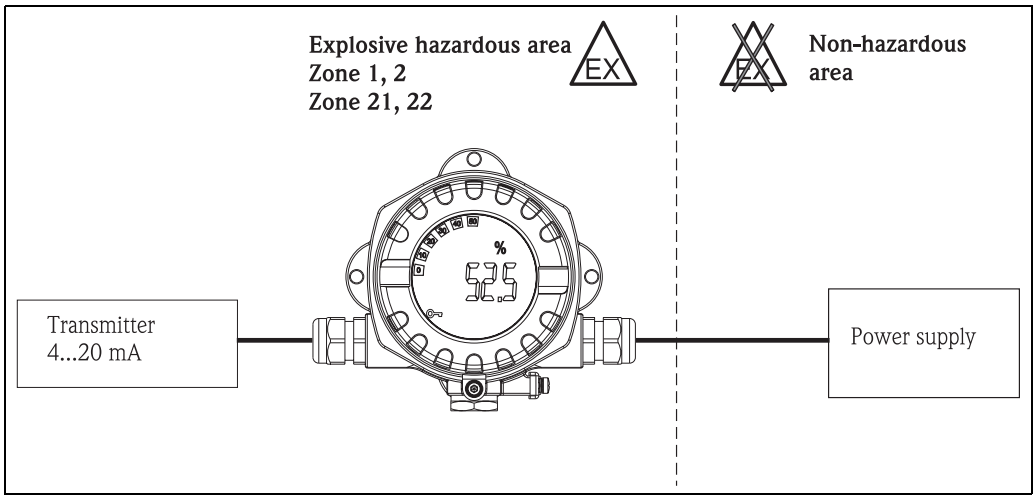
TI106R/09/en
51008480

Endress+Hauser

People for Process Automation

Function and system design

Measuring principle



Example of an application of the field display unit

The display unit records an analog measuring signal and shows this on the display with background illumination. The LC display shows the current measured value digitally and as a bargraph with limit value violation signalling. The display unit is looped into the 4 to 20 mA circuit and obtains the required energy from there.

Measuring system

Microcontroller controlled display unit in single chamber field housing with illuminated LC display. The measuring range, decimal point and offset of the display can be configured comfortably by means of three keys in the device with the housing open or by means of a PC with the ReadWin® 2000 PC software. The background illumination of the display is always activated and does not require additional wiring for the power supply.

Input

Measured variable

Current

Measuring range

4 to 20 mA (reverse polarity protection)

Input

- Line voltage drop < 4 V at 3 - 22 mA
- Max. line voltage drop < 6 V at max. short-circuit current 200 mA

Output

Output

Digital limit switch
Passive, open collector:
I_{max} = 200 mA
U_{max}= 35 V
$U_{low/max}$ = < 2 V at 200 mA
Max. reaction time to limit value = 250 ms

Signal on alarm

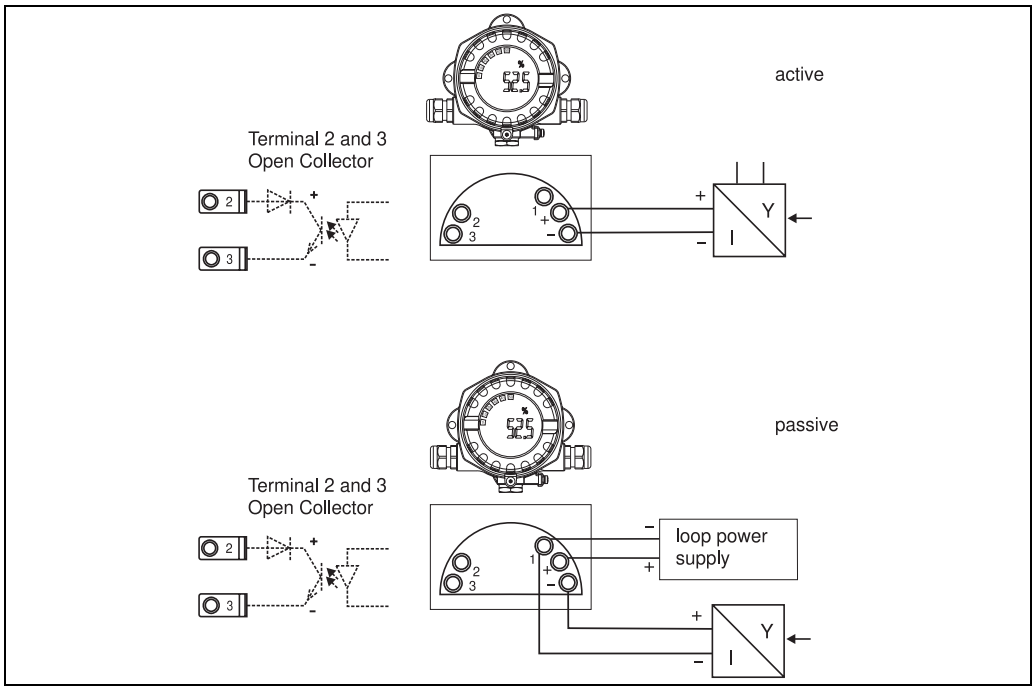
No measured value visible on the LC display, no background illumination.

Transmission behavior

The display unit allows the HART® transmission protocol to pass unimpeded.

Power supply

Electrical connection



Terminal assignment of field display unit

Terminal	Terminal assignment	Input and output
+	Measuring signal (+) 4 to 20 mA	Signal input
-	Measuring signal (-) 4 to 20 mA	Signal input
1	Terminal for further instrumentation	Support terminal
2	Digital limit switch (collector)	Switch output
3	Digital limit switch (emitter)	Switch output

Supply voltage

Supply by means of the 4 to 20 mA current loop.

Cable entry

The following cable entries are available:

- 3x thread NPT1 + 1x blind plug
- 3x thread M20 + 1x blind plug
- 2x gland M20 + 1 x blind plug
- 3x thread G1/2 + 1 x blind plug

Performance characteristics

Reference operating conditions	T= 25 °C (77 °F)
Maximum measured error	< 0.1% of scaled display range
Influence of ambient temperature (temperature drift)	Effect on the accuracy when ambient temperature changes by 1 K (1.8 °F): 0.01%

Installation

Installation instructions	**Mounting location** Wall or pipe mounting (see 'Accessories') **Orientation** No restrictions

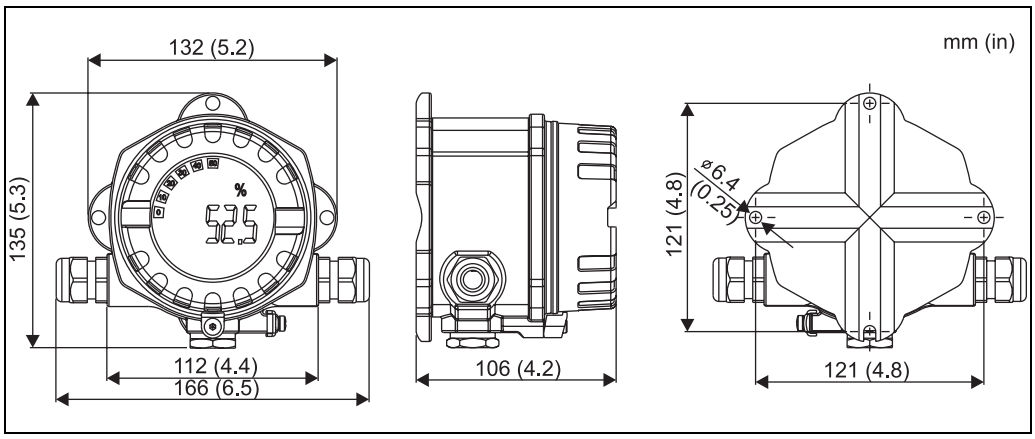
Environment

Ambient temperature limits	-40 to +80 °C (-40 to +176 °F)  Note! The display can react slowly for temperatures < -20 °C (< -4 °F). Readability of the display cannot be guaranteed at temperatures < -30 °C (-22 °F).
Storage temperature	-40 to +85 °C (-40 to +185 °F)
Electrical safety	As per IEC 61010-1, UL61010-1, CSA C22.2 No. 1010.1-92
Climate class	As per IEC 60 654-1, Class C
Degree of protection	IP 67, NEMA 4X
Shock and vibration resistance	3g / 2 to 150 Hz as per IEC 60 068-2-6
Condensation	Permitted
Installation category	1 to IEC 61010
Pollution degree	2 to IEC 61010
Electromagnetic compatibility (EMC)	■ EN 61326 (IEC 61326): Electromagnetic compatibility (EMC requirements) ■ NAMUR (NE21): Association for Standards for Control and Regulation in the Chemical Industry

Mechanical construction

Design, dimensions

Die cast aluminum housing for general purpose or as option stainless steel housing



Data in mm (data in inches in brackets)

- Electronics compartment and connection compartment together in the single chamber housing
- Display can be rotated in 90°-stages

Weight

- Approx. 1.6 kg (3.53 lb) (aluminium housing)
- Approx. 4.2 kg (9.26 lb) (stainless steel housing)

Material

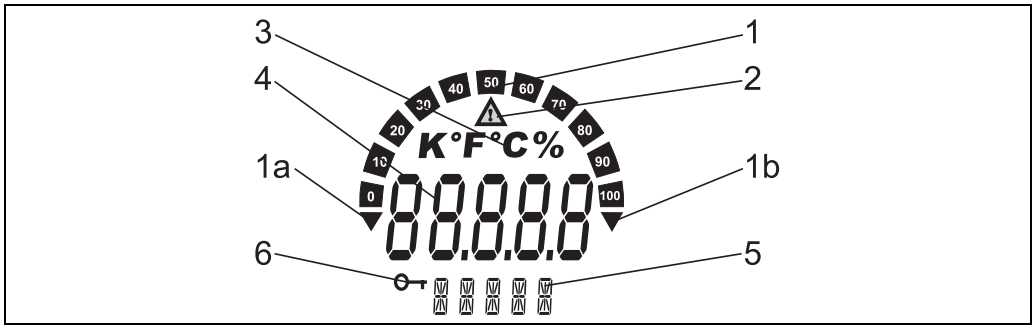
Housing	Nameplate
Die-cast aluminum housing AlSi10Mg with powder coating on polyester basis	Aluminum AlMgl, anodized in black
Stainless steel 1.4435 (AISI 316L)	1.4301 (AISI 304)

Terminals

Cables / wires up to max. 2.5 mm^2 (AWG 13) plus ferrule

Human interface

Display elements



LC display of the field display unit (illuminated, pluggable in 90° stages)

Item 1: bargraph display in increments of 10% with indicators for measuring range undershoot (item 1a)/overshoot (item 1b)
Item 2: warning sign in the case of limit value violation
Item 3: unit indicator K, °F, °C or %
Item 4: measured value display (character height 20.5 mm/0.8")
Item 5: status and information indicator / configuration
Item 6: 'programming disabled' indicator

- Display range
  -19999 to +99999
- Offset
  -19999 to +99999
- Signalling
  Measuring range overshoot/undershoot
- Limit value violation
  Lower/upper limit value exceeded

Operating elements

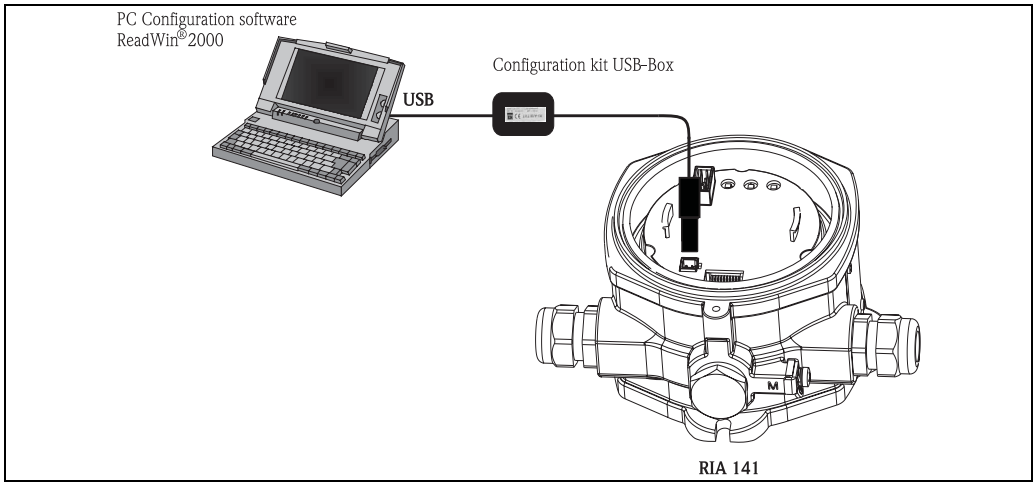
3-key operation (-/+/E) integrated in device, access with housing open

Remote operation

Configuration
The device is configured with the ReadWin® 2000 PC operating software.

Interface
Configuration interface at device; connection to PC via configuration kit (see "Accessories").

Configurable device parameters (selection)
Measuring dimension, measuring ranges (linear/square), setup block using user code, failsafe mode, digital filter (damping), offset, limit value (min/max/alarm), alarm limit values freely adjustable.



Configuration with ReadWin® 2000 PC operating software.

Certificates and approvals

CE mark

The device complies with the legal requirements of the EC directives. Endress+Hauser confirms that the device has been successfully tested by affixing to it the CE mark.

Hazardous area approvals

Information about currently available Ex versions (ATEX, FM, CSA, etc.) can be supplied by your E+H Sales Center on request. All explosion protection data are given in a separate documentation which is available upon request.

Other standards and guidelines

- IEC 60529:
  Degree of protection provided by housing (IP-Code)
- IEC 61010-1:
  Safety requirements for electrical measurement, control and laboratory use.
- IEC 61326-1:
  Electromagnetic compatibility (EMC requirements)
- NAMUR
  Standards working group for measurement and control technology in the chemical industry.
  (www.namur.de)

UL

Recognized component to UL 3111-1

CSA GP CSA General Purpose

Ordering information

Product structure

RIA141	**1 channel, scalable, for 4-20mA, loop powered, display LC 5 digits, 20.5 mm high, bargraph resolution 10 %, over/underrange, engineering units, 3 key operation, digital limit switch, UL recognized, CSA-GP**							
	Approval							
	A	Version for non-hazardous areas						
	B	ATEX	II2G EEx d IIC T6					
	C	FM	XP, NI, DIP Cl. I, II, III/1+2 Gr. ABCDEFG					
	D	CSA	XP, NI, DIP I, II, III/1+2/ Gr. ABCDEFG					
	E	ATEX	II3G EEx nA IIC T4/T5/T6					
	F	ATEX	II2D					
	G	NEPSI	Ex d IIC T4-T6					
	H	NEPSI	Ex nAL IIC T4-T6					
	I	ATEX	II2 (1)G Ex ia IIC T6					
		Housing						
		1	Field, alu die cast					
		2	Field, 316L					
			Cable entry					
			A	3x thread NPT ½ + 1x blind plug				
			B	3x thread M20 + 1x blind plug				
			C	2x gland M20 + 1x blind plug				
			D	3x thread G½ + 1x blind plug				
				Mounting bracket				
				1	without			
				2	Pipe 2", 316L			
						Additional option		
						1	Basic version	
						2	Works calibration certificate, 5-point	
							Version	
							A	Standard
RIA141-								⇐ **order code**

Accessories

Order code	Accessory
51007995	Mounting bracket
51004949	1 x cable entry M20x1.5
51006845	1 x cable gland NPT ½"
51004489	1 x blank (blind) M20x1.5
51004490	1 x blank (blind) NPT ½"
51004916	1 x blank (blind) JIS G½"
51003528	TAG imprint 2x16 characters
TXU10-	■ Configuration kit for PC programming (Interface cable for PC with USB port + ReadWin® 2000 PC software) ■ ReadWin® 2000 can be downloaded free of charge from the Internet at the following address: www.endress.com/readwin

Documentation

- 'System components' field of activities brochure (FA016K/09/en)
- Operating Instructions for 'RIA141 field display unit' (BA177R/09/a3)
- Supplementary Ex documentation:
  ATEX II2G EEx d: XA045R/09/a3
  ATEX II1/2D: XA046R/09/a3
  ATEX II3G: XA047R/09/a3
  ATEX II2 (1)G Ex ia: XA075R/a3
- FM Control Drawing: 021500113
- CSA Control Drawing: 021500114

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